

Ultrasonic Drilling and Coring

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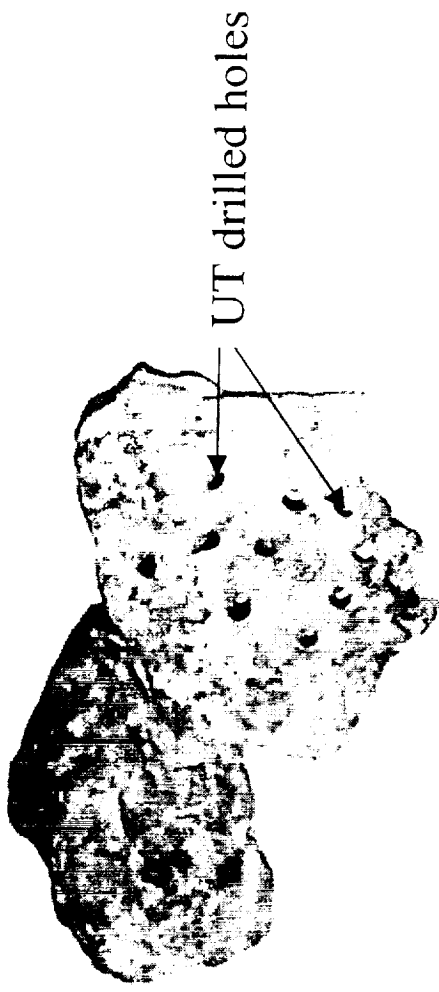
Participants:

JPL: Stewart Sherrit and Benjamin Dolgin

Cybersonics: Thomas Peterson and Dharmendra Pal

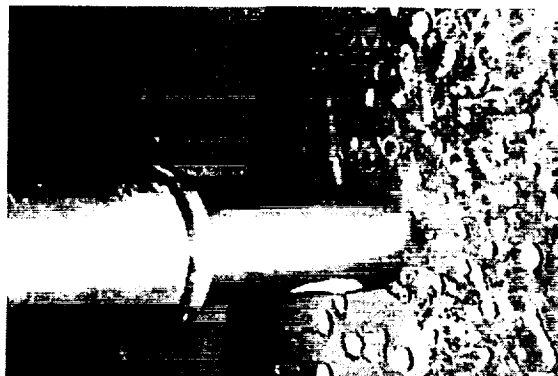
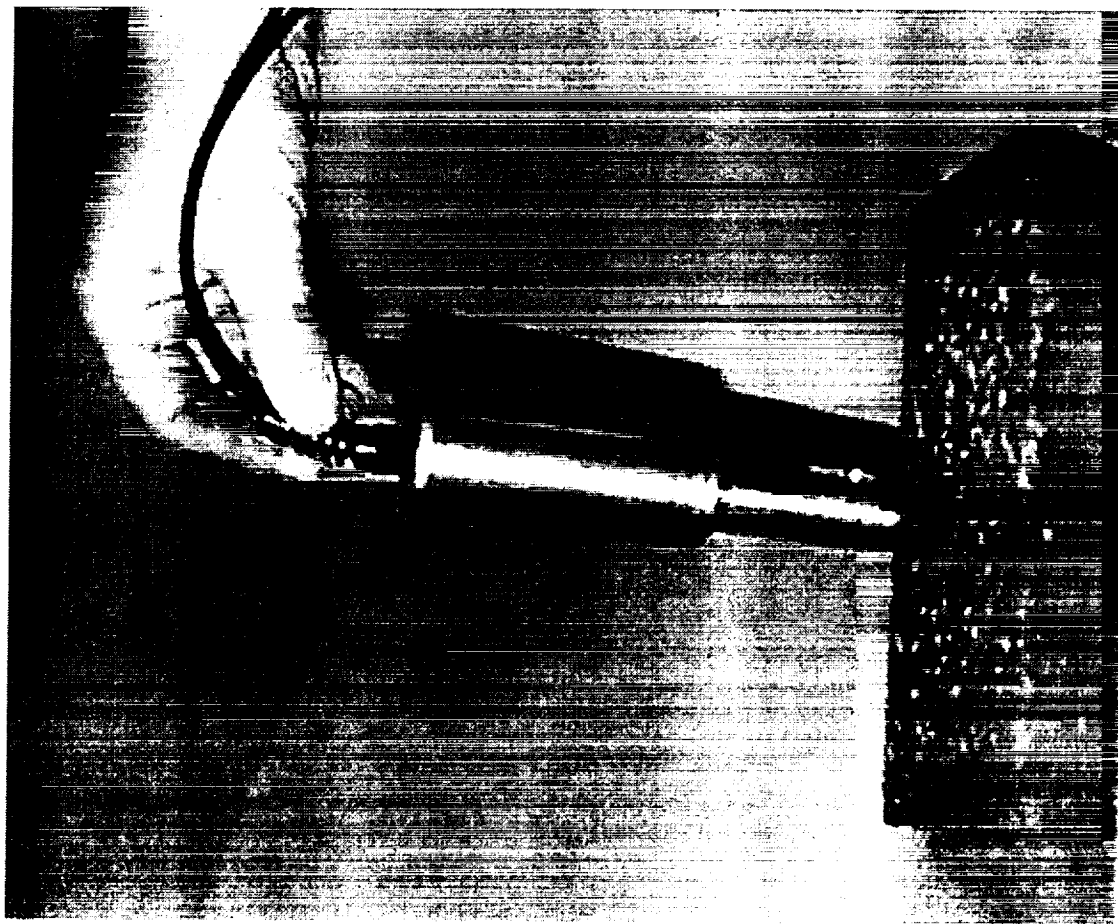
NASA Space Mechanisms Working Group
Video Conference, December 15, 1998

FLEXIBLE GUIDEWIRE ULTRASONIC DRILLING

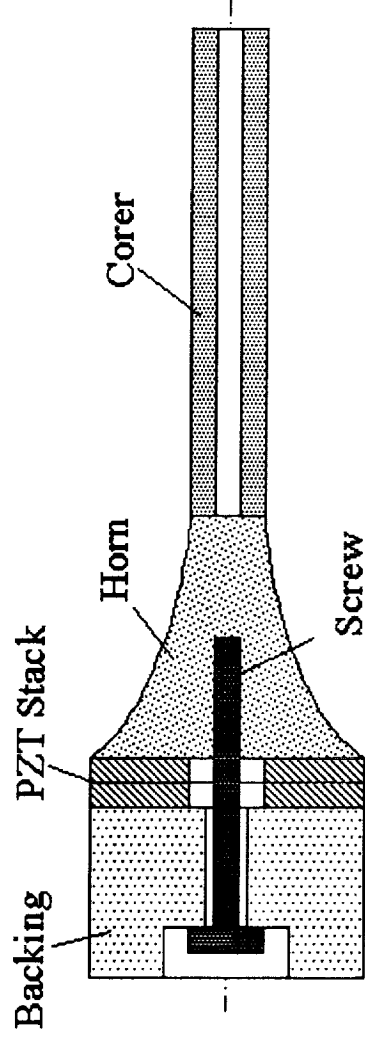


- Ultrasonic device demonstrated to drill rocks.
- Tungsten carbide flexible wire is guided in arteries to destroy blockages.

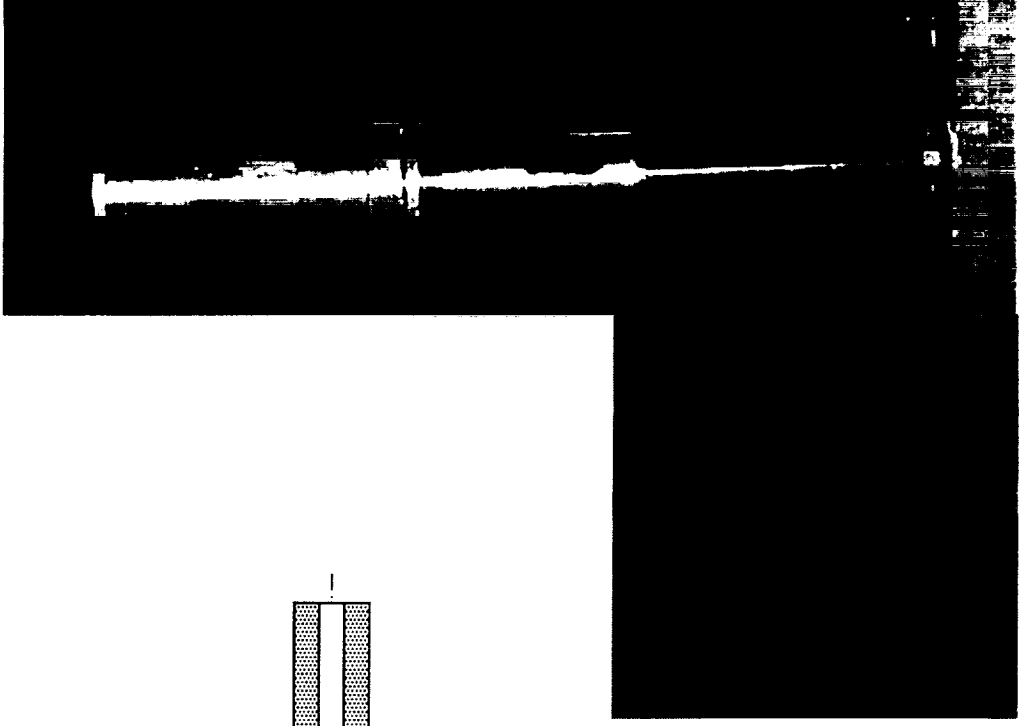
Ultrasonic Driller



Ultrasonic Corer

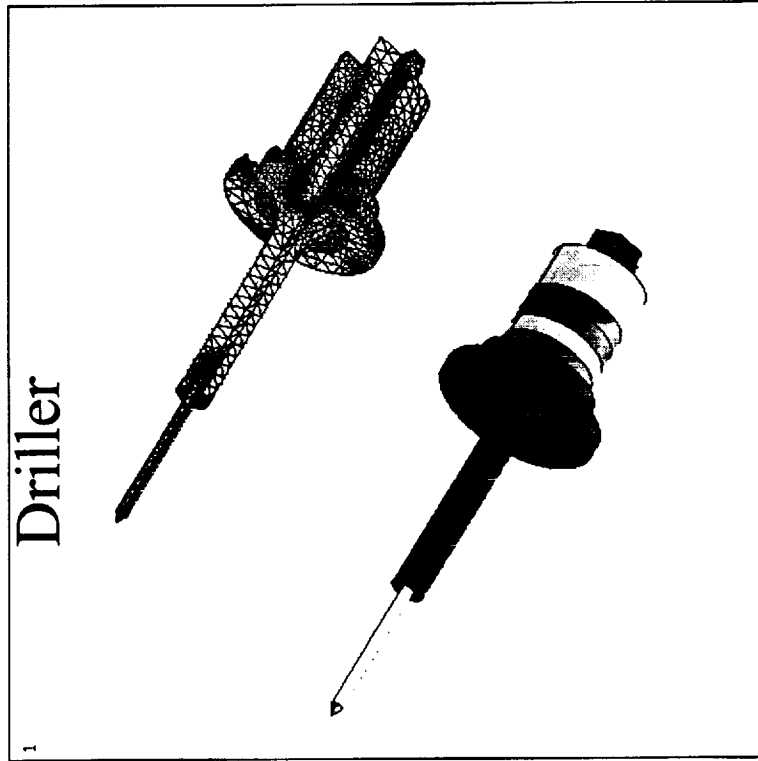


General view of the corer actuator and end effector



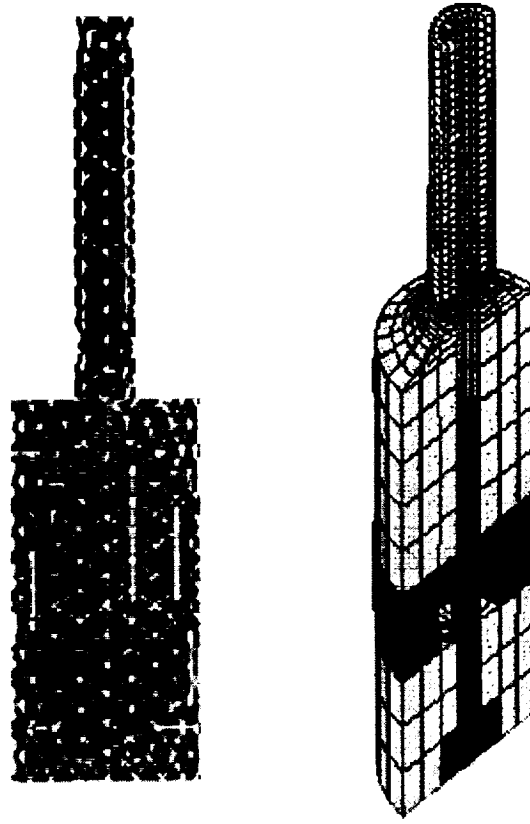
FEM of Ultrasonic Driller/Corer

Driller



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EPACET

Corer



Commercialization potential

- Medical application to orthopedic operations and others
- Construction tools
- Robotic drilling and hammering
- Potential consumer product (e.g., concrete drilling tool at Homedepot).
- Effective grinder and marker, ceramic machining, etc.

Summary

- A novel drilling and coring device, driven by a combination of sonic and ultrasonic vibration, was developed.
- The device is applicable to soft and hard objects using low axial load and potentially operational under extreme conditions.
- The device has numerous potential planetary applications.
- Significant potential for commercialization in construction, demining, drilling and medical technologies.

